

Products that help people and the planet

Semiconductor technologies have made life more productive and more fun – people are working more efficiently than ever before, have access to more information in more places, and communicate with each other in all kinds of new ways. NXP's products are essential components in these familiar applications, but we also make products that work behind the scenes to help people and the planet. We make it safer for people to travel, bring new services to people in remote areas, and save energy at home, the office, and on the road.

ePassports:

Ensuring safe, secure travel

Over the next ten years, many of the 750 million passports currently in use will be replaced by new documents, called ePassports, equipped with electronics that can securely store personal data. The idea is to create the strongest link possible between the document and its owner, while guarding against forgery and respecting every individual's right to privacy.

NXP has been at the forefront of the ePassport initiative for some time, and is a recognized leader in the identification (ID) technologies that ePassports use. Of the 60 countries looking to implement ePassport schemes, more than 75% of them have chosen NXP as their sole supplier or one of their partners.

Our SmartMX product line for ePassports is highly secure and lets travelers move more easily from country to country while meeting today's heightened requirements for safety and security. The technology uses highly advanced counter measures to ward off attacks and has hardware firewalls that keep personal data safe and secure. It also meets the new EU standard that requires digital biometric information (two fingerprints) on all passports by June 2009. Germany is already using this new capability, and began introducing enhanced e-Passports powered by NXP ICs in late 2007.

The growing use of ePassports offers proof that privacy can co-exist with security, and is helping to build public acceptance of chip-enabled documents. That, in turn,

is helping to open up new applications for NXP's secure technologies, including ID cards, health cards, and driver's licenses.

eBanking:

Bringing new services to remote areas

According to figures from the Reserve Bank of India, roughly 40% of all Indians lack access to formal financial services and largely go "unbanked." For people in rural, inaccessible areas, having no bank makes it hard to access government programs like social security, and limits their ability to benefit from important economic opportunities like micro-loans.

NXP is working with A Little World, an India-based provider of rural banking solutions, to improve the situation. Together, the two companies have developed a solution that makes it easy to offer full-featured banking services in hard-to-reach areas.

Using a phone equipped with NXP-designed Near Field Communication (NFC) and Radio Frequency Identification (RFID), villagers interact with A Little World's new ZERO micro-banking platform to access a full range of essential banking services. Villagers are given a contactless smartcard that they simply bring near the NFC-enabled phone to begin banking. The phone and the contactless smartcard store each customer's name, address, photograph, and fingerprint templates, plus relevant details of the accounts held by the issuing bank. These details are used with a real-time fingerprint to authenticate the transactions, thus making them safe and secure.

Seven banks have deployed the new solution, as part of a pilot project, in 450 villages across four states in India. More than 2,000 NFC-enabled phones have been put into use and more than 500,000 bank accounts have been deployed, with another four million accounts expected over the next few months. The government supports the project because it provides mainstream services to rural areas, and banks like it because it saves them the cost and effort of setting up physical branches in rural areas. It's a simple, secure, cost-effective solution that benefits everyone involved.

Automobiles:

Adding electronics for higher efficiency

Although the basic design of the combustion engine hasn't changed much since its invention in the late 1800s, there's a lot to be said for how electronics have transformed vehicle design. Beyond features like GPS for navigation, onboard DVD players, and "smart" features like automatic headlights and windshield wipers, today's cars are an army of semiconductor-powered electronics that make them more responsive, safer, more immune to theft, and, in particular, more energy-efficient.

NXP is a leading provider of semiconductors for automotive applications, emphasizing sensors and in-automobile networking (our FlexRay technology is number one worldwide). Using these technologies, we're helping cars make better use of fuel and replacing heavy mechanical components with lightweight alternatives that improve overall efficiency. Here are some examples:

► FlexRay networks

A typical car today has up to 100 electronic-control modules (such as ABS, ESP, automatic windows, and rear-seat entertainment) that communicate with each other via an extensive network of heavy copper wires. All those wires add weight – as much as 100 kilograms in some cases – and make the car less fuel-efficient. NXP's FlexRay technology operates via a single bus system and does away with the copper wires, thus eliminating the extra weight. On average, replacing copper with FlexRay can stretch a tank of gas by an extra eight kilometers. Applied to all cars globally for a year, that extra mileage would mean preventing 15 megatons of CO₂ from entering the atmosphere.

► Engine-control sensors

Studies have shown that as much as 75% of the energy in a fuel tank is lost to engine and driveline efficiencies and idling. The engine is a harsh environment, but precision measurement systems that can withstand high temperatures can dramatically improve efficiency. The engine's computer unit can read NXP sensors located at the crank and cam shaft, and use the

real-time sensor information to regulate fuel flow, match air intake, or even adjust the spark timing for various RPMs and engine loads. The result is better engine performance and optimized emissions.

► **Tire-pressure sensors**

According to the National Highway Traffic Safety Administration (NHTSA) in the US, four million gallons of fuel a day (over 5 billion liters per year) are wasted due to low tire pressure. Inflating the tires to the proper pressure can raise fuel efficiency, extend the life of the tires, and boost fuel savings. Tire-pressure monitoring systems, built using NXP silicon, alert drivers when it's time to add air to the tires.

Energy-efficient lighting: Driving the "green" revolution

Recent studies show that lighting – that is, the electricity used to light homes, shops, offices, signs, public spaces, and streetlights – accounts for roughly 20% of all electricity consumption worldwide. With a number that high, it's no surprise that consumers, companies, and governments around the globe are looking for energy-efficient alternatives to traditional lighting.

NXP was one of the first semiconductor companies to recognize the importance of energy-efficient lighting, and has made lighting a focus for more than 15 years. We have one of the widest lighting portfolios in the industry, with system-level solutions for a range of energy-efficient technologies, including CFL (Compact Fluorescent Lighting), HID (High Intensity Discharge Lighting), HF TL (High Frequency Tube Lamp), and others. Switching to these new technologies could save up to 40% in electricity costs. On a yearly basis, that's equal to a savings of about EUR 100 billion, and more than 50 million tons of CO₂.

In the near term, CFLs, with their "squiggly" bulbs, are becoming familiar replacements for incandescent lights, especially in the home, and promise to continue growing in popularity. Over the longer term, NXP is driving the transition to a new lighting technology, called SSL (Solid State Lighting), which is based on high-brightness LEDs. SSL shows great promise for

reliability, design flexibility, and longevity. It delivers bright colors at a high intensity, while consuming less overall power.

SSL is a good candidate for outdoor applications, where it can be used to provide efficient, dimmable lighting along city streets and highways. During quieter periods, SSL lights can use advanced dimming capabilities to control light intensity, thus saving energy and reducing light pollution while maintaining safe driving conditions. Using a 65-W LED lamp to replace a traditional 125-W high-performance lamp (HPL) in an outdoor application can reduce power consumption by as much as 50%, and can save 115 kg of CO₂ per lamp per year.

SSL is also well suited to indoor use, especially retail applications. It has white-color rendering that nearly matches daylight, and color accuracy that stays true over the lifetime of the lamp, so it shows products at their best and reduces eye strain.

PC power supplies: Delivering the world's most energy-efficient solution

The power supply of a desktop or laptop computer takes the power from a wall socket and converts it into a voltage the PC can use. This process, which converts mains voltages to all the voltages needed by the PC, leads to inefficiencies, with as much as 40% of the applied electricity being lost. Given the millions and millions of computers in use today, these losses can really add up.

NXP has developed a power-supply chipset, called GreenChip PC, that's been designed into the world's most efficient PC power supply (silverbox) solution. The design uses innovative techniques to increase efficiency, lower noise, and reduce the bill of materials. It also cuts power losses by up to 50%, and reduces or even eliminates the need for a cooling fan.

Beyond PC power supplies, other high-power applications, including flat-screen TVs, can benefit from GreenChip as well, gaining lower standby power and improved efficiency, with advanced safety features.

GreenChip is now in its third generation and is expected to produce its 400 millionth IC in 2008. Every appliance that has a GreenChip power-supply controller saves about 60 kW hours per year. For a consumer, that means an average savings of around EUR 10 per year per appliance. Worldwide, GreenChip is saving more than EUR 1 billion on energy costs.

LCD screens: Saving energy with better, smarter technology

The bulky CRTs used in yesterday's TVs and computer monitors are quickly being replaced by slim LCD screens. The new LCD panels offer clear, colorful pictures and save a lot of space, but there's still room for improvement in their power consumption.

In the average 40-inch LCD panel, roughly 75% of the energy is used for screen illumination. NXP's Solid State Lighting (SSL) solutions can help lower that number. By replacing the conventional light source typically used in the backlight application with SSL, which uses LEDs for its light source, manufacturers can save energy, improve color performance, reduce heat generation, and extend the life of the display.

NXP technologies also help improve the operation of the backlight itself. In standard LCD panels, the backlight unit lights every pixel at 100% brightness at all times. When the video content requires that a pixel should be dark or grey, the pixel is still lit at 100% while the LCD cell modulates the pixel brightness.

By using white LEDs with 2D dimming, the luminance of each LED segment can be controlled individually. The light output of each LED is controlled, according to time and location, as required by the video content, thereby saving about 60% of the power needed for the backlight. In color displays that use RGB LEDs with 2D color dimming, the savings can be even greater. Colors are only produced when and where they're needed, for savings of up to 75%. In the end, the use of 2D dimming can reduce the LCD TV's overall energy consumption by more than 60%.